

# Aquatic and Marshy Angiosperms of Roorkee Sub-division

BY

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In this paper the authors have enumerated 78 species belonging to 46 genera and 31 families. The family Cyperaceae is dominant in the area.

## INTRODUCTION

Aquatic plants constitute a peculiar form of plant life. In India the hydrophytes have attracted the attention of a good number of workers. Subramanyam's AQUATIC ANGIOSPERMS (1962) gives a detailed account of the study of this group. But there is little data on the vegetation found in and near running water.

We, therefore, undertook the study of the vegetation along the banks of ponds, lakes and streams.

Roorkee, in the sub-Himalayan tract, has climate marked by both dry and rainy seasons. During the monsoons, the water level is usually high and banks are flooded. After the monsoon, the water level goes down, exposing extensive areas of the banks. In the month of October the banks are muddy, and have sparse vegetation.

During the course of the survey of medicinal plants of Roorkee Sub-Division a collection of aquatic and marshy plants was also made. The habitat, flowering period, distribution, were studied. The plants were identified and later confirmed at the F.R.I. herbarium, Dehra Dun. The herbarium sheets were deposited in the Herbarium, Survey of Medicinal Plants, Gurukul Kangri (Hardwar).

The order of families followed in this paper is that of Duthie in the FLORA OF THE UPPER GANGETIC PLAIN. Hutchinson (1959)<sup>2</sup> has been followed in splitting of families. An attempt has been made to bring the nomenclature up-to-date as far as possible. The plants marked with an asterisk (\*) have not been recorded in Duthie's flora but were reported by subsequent workers from the Upper Gangetic Plain.

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<sup>1</sup> S. M. P., Gurukul Kangri.

<sup>2</sup> HUTCHINSON, J. (1959) The Families of Flowering Plants. 2 vols, Oxford.

## GEOGRAPHY OF THE AREA

Roorkee Sub-Division occupies an area of 1425 sq. km. The approximate bearings of Roorkee are 29° 58'N. and 78° 13'E.; it has an elevation of 290 m. above sea level and is bounded by Dehra Dun in the North and by Muzaffarnagar, Ganga River, and Saharanpur in the South, East and West respectively.

## TOPOGRAPHY AND SOILS

Roorkee, a part of the Indo-Gangetic Plain of north India, slopes gradually from North to South. The Ganga River flows through the area. In addition, there are a large number of temporary swamps and ditches that are full of water during the rainy season but become shallow marshes or even arable land in the winter or summer.

The soil of the area is generally loam but clay and sandy loam are also common. The pH of the soil varies between 6 and 8.

## CLIMATE

Roorkee has a dry sub-humid climate characterized by low rainfall and extremes of temperature. There are three well marked seasons: Summer from March to June; Rains from July to September; and Winter from October to February. The average rainfall of Roorkee is 1092 mm. 85% of which falls during July to September. Maximum temperature rises up to 43°C in June.

## HABITATS

There are many permanent ponds and jheels within the area that retain water throughout the year and are rich in hydrophytic vegetation. Besides, there are large number of temporary ponds and ditches which are full of water during rainy season but dry up during summer. The banks of the rivers and canals are also rich in marshy vegetation. The free floating aquatic herbs include: *Eichhornia crassipes* Solms, *Lemna paucicosta* Hegel., *Spirodela polyrrhiza* Schleid., *Utricularia stellaris* L.f., and *Wolffia microscopica* Kurz; the common submerged species are: *Ceratophyllum demersum* L., *Hydrilla verticillata* Royle, *Potamogeton crispus* L., *Vallisneria spiralis* L., and *Zannichellia palustris* L. The attached floating herbs include: *Aponogeton natans* (L.) Engl. & Krause, *Aponogeton crispum* Thunb., *Nymphaea nouchali* Burm. f., *Nymphaea stellata* Willd., *Monochoria vaginalis* Presl, *Potamogeton indicus* L., and *Sagittaria guayanensis* H.B. & K. The common species that occur in marshy places are *Typha elephantina* Roxb., *Arundo donax* L., *Caesulia*

*axillaris* Roxb., *Echinochloa crus-galli* Beauv., *Eleocharis plantaginea* R. Br., *Fimbristylis* spp., *Cyperus* spp., *Juncellus* spp., *Scirpus* spp., *Ipomoea reptans* Poir, and *Ranunculus sceleratus* L.

## LIST OF SPECIES

### RANUNCULACEAE

**Ranunculus aquatilis** Linn.

Fl. Nov.-January, Kankhal;  
*Singh* 4977.

**R. sceleratus** Linn.

Fl. Jan.-March, Jagdishpur;  
*Singh* 4979.

**R. leptopetala** Koehne.

Fl. July-Jan., Jagdishpur; *Singh*  
4959.

**Ammania baccifera** Linn.

Fl. Rainy season, Panjnerhi;  
*Dey* 4958.

**A. senegalensis** Lamk.

Fl. July-Sept. Jagdishpur; *Dey*  
& *Singh* 4971.

### NYMPHAEACEAE

**Nymphaea nouchali** Burm. f.

Fl. July-Sept., Pathri; *Dey* 4973.

**N. stellata** Willd.

Fl. July-September, Pathri; *Dey*  
& *Singh* 4972.

### ONAGRACEAE

**Jussiaea repens** Linn.

Fl. Sept.-Nov., Pathri; *Singh*  
4966.

**J. suffructicosa** Linn.

Fl. Sept.-Dec., Ranipur; *Singh*  
4965.

**J. perennis** (Linn.) Drenan.

Fl. Sept.-Nov., Roorkee; *Dey*  
5976.

**Epilobium hirsutum** Linn.

Fl. Sept.-Nov., Jawalapur; *Singh*  
4988.

### ELATINACEAE

**Bergia ammanioides** Roxb.

Fl. Oct.-Dec., Panjnerhi; *Singh*  
4962.

### PAPILIONACEAE

**Aeschynomene indica** Linn.

Fl. Aug.-Oct., Lakshar; *Singh*.  
4953.

### TRAPACEAE

**Trapa bispinosa** Roxb.

Fl. Sept.-Dec., Kankhal; *Dey*  
& *Singh* 1966.

### LYTHRACEAE

**Rotala densiflora** (Roth.) Koehne

Fl. Feb.-March, Jagdishpur;  
*Singh* 4983.

### UMBELLIFERAE

**Centella asiatica** (Linn.) Urban.

Fl. Sept.-Dec., Gurukul Kangri;  
*Dey* 4993.

**Hydrocotyle sibthoroides** Lamk.  
Fl. Sept.-Jan., Gurukul Kangri;  
*Dey* 4991.

**Oenanthe javanica** (Bil.) DC.  
Fl. April-May, Jawalapur; *Singh*  
4983.

COMPOSITAE

**Caesulia axillaris** Roxb.  
Fl. Sept.-Dec., Jawalapur; *Singh*  
4986.

CAMPANULACEAE

**Sphenoclea zeylanica** Gaertn.  
Fl. Aug.-Oct., Lashashar; *Singh*  
4968.

HYDROPHYLLACEAE

**Hydrolea zeylanica** (Linn.) Vahl  
Fl. Sept.-Oct., Bahadrad; *Singh*  
4956.

CONVOLVULACEAE

**Ipomoea reptans** Poir.  
Fl. Most part of the year.  
Dhanori; *Singh* 4964.

SCROPHULARIACEAE

**Limnophila gratioloides** R.Br.  
Fl. Oct.-Nov., Roorkee; *Singh*  
4955.

**Dopatrium junceum** Buch.-Ham.  
Fl. Aug.-Sept., Panjnerhi; *Dey*  
& *Singh* 4990.

**Veronica anagallis** Linn.  
Fl. Feb.-May, Gurukul Kangri;  
*Dey* & *Singh* 4978.

LENTIBULARIACEAE

**Utricularia stellaris** Linn.  
Fl. Sept.-Nov., Dhanori; *Dey*  
& *Singh* 4961.

**U. aurea** Lour.  
Fl. Oct.-Nov., Dhanori; *Dey*  
& *Singh* 4982.

ACANTHACEAE

**Hygrophila auriculata** (Schumach.)  
Heine.  
Fl. Sept.-Nov., *Dey* & *Singh*  
4987.

POLYGONACEAE

**Polygonum barbatum** Linn.  
Fl. Most part of the year. *Dey*  
& *Singh* 4991.

**P. hydropiper** Linn.  
Fl. Aug.-Feb., Mayapur; *Dey*  
& *Singh* 4992.

**P. lanigerum** R.Br.  
Fl. Sept.-Nov., Kankhal (Hard-  
war); *Dey* & *Singh* 4995.

**P. glabrum** Willd.  
Fl. Aug.-Dec., Kankhal; *Dey*  
& *Singh* 4996.

URTICACEAE

**Pouzolzia pentandra** Benn.  
Fl. Sept.-Dec., Panjnerhi; *Singh*  
4963.

SALICACEAE

**Salix tetrasperma** Roxb.  
Fl. Feb.-May, *Singh* 4984.

CERATOPHYLLACEAE

- Ceratophyllum demersum** Linn.  
Fl. Sept.-Nov., Manglor; *Dey & Singh* 4997.

HYDROCHARITACEAE

- Hydrilla verticillata** Royle  
Fl. Nov.-Dec., Jawalapur; *Dey & Singh* 4960.

- Vallisneria spiralis** Linn.  
*Dey & Singh* 4906.

PONTEDERIACEAE

- \***Eichhornia crassipes** (Mart.) Solms  
Fl. Sept.-Nov., Gurukul Kangri; *Dey & Singh* 4910.

- Monochoria vaginalis** Presl  
Fl. Aug.-Nov., Lakshar; *Dey & Singh* 4957.

THYPHACEAE

- Typha elephantina** Roxb.  
Fl. July-Sept., Lakshar; *Dey & Singh* 4998.

LEMNACEAE

- Spirodela polyrrhiza** Schleid.  
Panjnerhi; *Singh* 4999.
- Lemna paucicostata** Hegelm.  
Fl. Not seen. Jagdishpur; *Dey & Singh* 4991.

- Wolffia microscopica** Kurz  
Jagdishpur; *Dey & Singh* 5000.

ALISMACEAE

- Sagittaria guayanensis** H.B.K.  
Fl. Aug.-Oct., Lakshar; *Singh* 4974.

APONOGETONACEAE

- \***Aponogeton natans** (Linn.) Engl. & Krause  
Fl. Aug.-Nov., Bahadrabad; *Singh* 4970.

- A. crispum** Thunb.  
Fl. Aug.-Nov., Pathri; *Dey & Singh* 4960.

POTAMOGETONACEAE

- Potamogeton indicus** Roxb.  
Fl. Feb.-June, Jawalapur; *Dey* 4980.

- P. crispus** Linn.  
Fl. Feb.-May, Jawalapur; *Dey & Singh* 4974.

- P. pectinatus** Linn.  
Fl. Feb.-May, Jawalapur; *Dey & Singh* 4913.

ZANNICHELLIACEAE

- Zannichellia palustris** Linn.  
Fl. Feb.-March, Danpur; *Dey & Singh* 4921.

NAIDACEAE

- Naias minor** All.  
Fl. Aug.-Oct., Kankhal; *Dey & Singh* 4881.

ERICAULACEAE

- Eriocaulon sieboldianum** Seib.  
Fl. Oct.-Nov., Ajitpur; *Dey & Singh* 4915.

CYPERACEAE

- Cyperus iria** Linn.  
Fl. Aug.-Oct., Panjnerhi; *Dey & Singh* 4945.

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| <b>C. eleusinoides</b> Kunth                             | <b>F. miliacea</b> Vahl                                  |
| Fl. Aug.-Nov., Panjnerhi; <i>Dey &amp; Singh</i> 4941.   | Fl. July-Sept., Panjnerhi; <i>Dey &amp; Singh</i> 4942.  |
| <b>C. exaltatus</b> Retz.                                | <b>Scirpus mucronatus</b> Linn.                          |
| Fl. Aug.-Nov., Panjnerhi; <i>Dey &amp; Singh</i> 4940.   | Fl. Oct.-Nov., Panjnerhi; <i>Dey &amp; Singh</i> 4948.   |
| <b>C. globosus</b> All.                                  | <b>S. maritimus</b> Linn.                                |
| Fl. Aug.-Nov., Panjnerhi; <i>Dey &amp; Singh</i> 4944.   | Fl. Dec.-Feb., Kankhal; <i>Dey &amp; Singh</i> 4989.     |
| <b>Juncellus laevigatus</b> C. B. Clarke                 |  |
| Fl. Aug.-Sept., Kankhal; <i>Dey &amp; Singh</i> 4951.    | GRAMINEAE  |
| <b>Mariscus dilutus</b> Nees                             | <b>Phragmites karka</b> (Retz.) Trin. ex Steud.          |
| Fl. July-Sept., Misharpur; <i>Dey &amp; Singh</i> 4948.  | Fl. Oct.-Dec., Kankhal; <i>Dey &amp; Singh</i> 4920.     |
| <b>Eleocharis plantaginea</b> R.Br.                      | <b>Echinochloa crus-galli</b> (Linn.) Beauv.             |
| Fl. Sept.-Nov., Bahadradab; <i>Dey &amp; Singh</i> 4947. | Fl. Aug.-Nov., Jawalapur; <i>Dey &amp; Singh</i> 4949.   |
| <b>Fimbristylis dichotoma</b> (Linn.) Vahl               | <b>Oryza sativa</b> Linn.                                |
| Fl. July-Oct., Kankhal; <i>Dey &amp; Singh</i> 4953.     | Fl. Sept.-Nov., Bahadradab; <i>Dey &amp; Singh</i> 1966. |
| <b>F. monostachya</b> Hassk.                             |  |
| Fl. July-Sept., Jagdishpur; <i>Dey &amp; Singh</i> 4954. |  |

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